Occupational Health Information System Implementation at Johnson Space center

Denton R. Crotchett, CIH (Kelsey-Seybold)

Edward H. Norris (Comprehensive Health Services)

Overview

- Where we were in CY2000
- JSC CY2000 contract requirements
- The first vision
- Beginning the implementation
- The second vision (SEG emphasis)
- Where it grew - HERS to HIS – What was done
- System Analysis, Design, Build
- Implementation of retrospective data entry
- Corporate/Common data tables
- The foundation for the future
- Summary

Where We Were in CY2000

- Paper records
  - Reports in file cabinets – filed by building
  - Bound industrial hygiene sample log book
  - Complaint log, asbestos notifications, training sign up
  - Work activity assignment and tracking
- Free standing information systems
  - Material Safety Data Sheet (MSDS) Database
    - 28,000 paper documents (7000 available electronically)
  - Hazardous Material Inventory Database
  - Laboratory Information Management System (LIMS) (LIMS I – 1993; LIMS II – 1997)
  - Training Database (on a personal computer)
  - Radioactive Materials Inventory (on a PC)
  - TSI Respirator Fit Testing records (on a PC)
  - Metrosonics Noise Exposure Data (on a PC)

Where We Were in CY2000

- Computers for word processing
- Result of our paper driven systems
  - Hard to track work completed
  - Hard to trace exposure history for people/activities
  - Hard to rank order hazards
  - Medical surveillance not tied to exposures (except for noise and the Hearing Conservation program)
  - Annual sampling strategy weak
    - Routine/scheduled work
    - Based on personal knowledge
  - No comprehensive exposure assessments

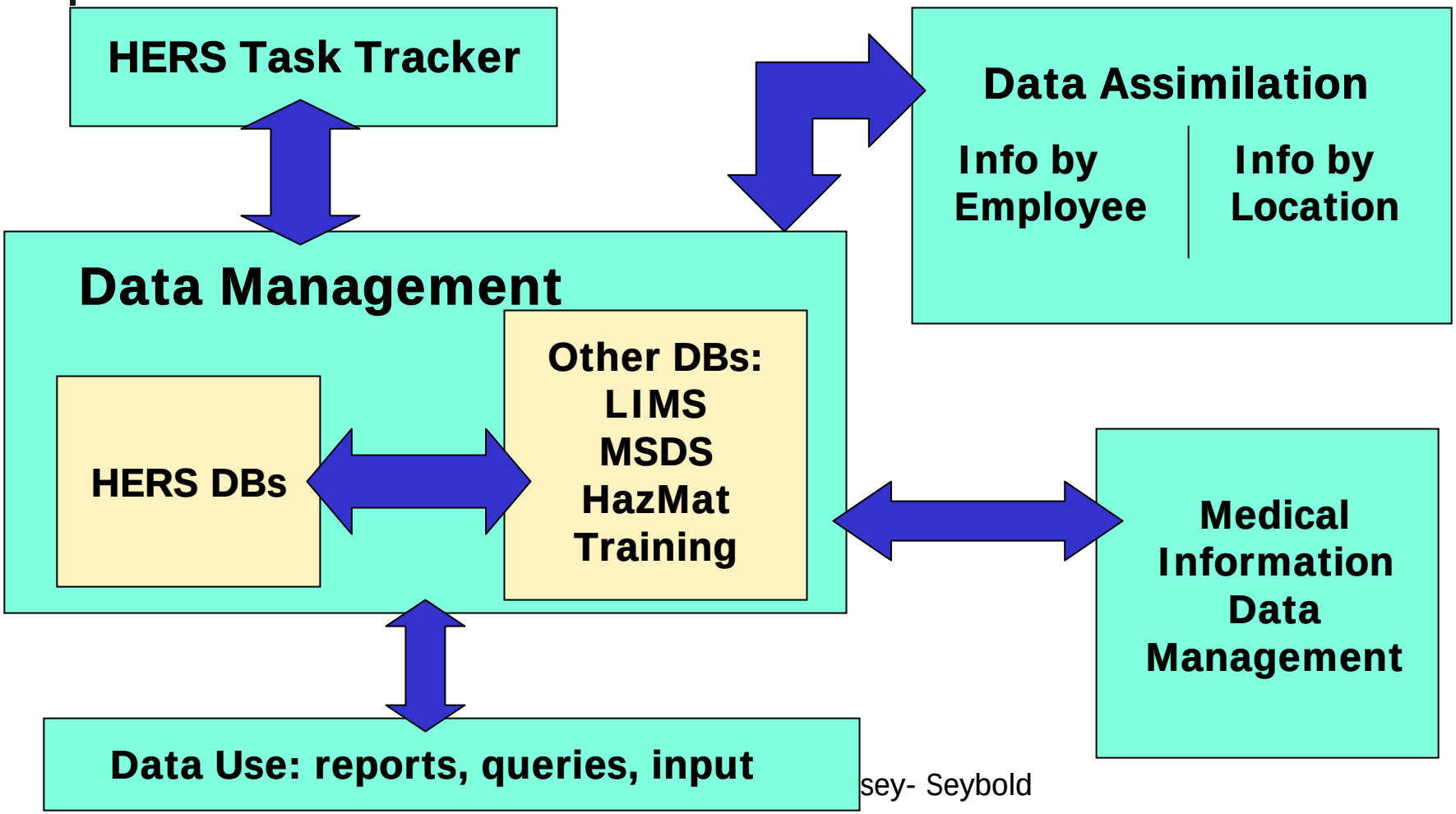
Contract Requirements - CY2000

- Computer based asbestos locations database
- Confined space database
- Inventory of radiation sources
- Manage, maintain and update LIMS
- DRD 10: Develop and maintain occupational health and personal exposure database
  - Retrospective from 1997
  - Asbestos exposure, environmental monitoring, bulk sampling from 1985
  - Collection data
  - Statistical analysis and trending
- DRD 11: Develop and maintain Hazardous Building and Facility Component (HBFC) Database
  - Asbestos
  - Lead based paint
  - Confined spaces
  - Lasers
  - Ion./Non-ion. Radiation
  - PCBs
  - Cooling water towers (*Legionella*)
- DRD 12: Develop and support hazardous material management database
- DRD 12: develop, maintain, update MSDS inventory

The First Vision – Contract Proposal

- Integrated information technology approach
- Based on an existing Health and Environmental Resource System (HERS)
  - Developed at KSC – MSAccess platform

The First Vision – Contract Proposal



The First Vision – HERS Databases

- Exposure Monitoring
- Asbestos
- Complaints
- Confined Spaces
- Equipment tracking
- Discrepancy reporting
- Ergonomics
- Ventilation Hoods
- IAQ
- Noise Exposure
- Noise Locations
- Training
- Respiratory protection
- Facility Inspections
- Radiation Sources
- Laser Sources
- Radiation Dosimeters

Beginning the Implementation The Inherited Assumptions

- One size fits all – all NASA centers operate the same way
- We can make a few modifications and it will work
- We should be all up in running in a few weeks

Beginning the Implementation The Reality

- JSC had different business practices than KSC
- The HERS from KSC was not a “drop in” system
  - MSAccess structure cumbersome to modify
  - Resistance to change
  - Not user friendly in the eyes of JSC personnel
- A few weeks became a few years
  - Significant delay until hired a full time developer

Beginning the Implementation What Happened

- Hired full-time developer (Ed Norris, CHS)
- He worked with staff to:
  - Learn JSC's business practices
    - Developed knowledge of processes
    - Developed knowledge of interface required by other systems
  - Learn the HERS system
- He Changed HERS to:
  - Table driven – easier to modify
  - SQL back end – better application
  - HTML (web-based) front end – easier to navigate
- Renamed to HIS – Hygiene Information System

Beginning the Implementation

- Prioritized the work on HERS modules
  - Industrial Hygiene programs
  - Retrospective Data entry
  - Radiation programs
  - Administrative data/call log
  - Ergonomics programs
  - Training programs
  - Environmental Surveillance (ES) programs
- Changes in one area forced significant changes else where (e.g.; LIMS, ES)
- The more we talked the more things changed

Beginning the Implementation

- Determined we needed “corporate” level databases
  - Information common across multiple OHS and medical applications
  - Locations (e.g.; building and room)
  - People
  - Training
- Potential exists for “corporate” level DBs to become Center Level DBs

The Second Vision - Where We Decide to Head

- In refining our processes and work practices JSC decided to emphasize and build around the:

  Similar Exposure Group (SEG)

  A group of employees performing the same work activities and receiving the same exposures. Exposure measurements on any member of the group represent an exposure to anyone in the group.

SEG Based Data Organization

- General
- Physical Hazards
  - Thermal
  - Noise
  - Radiation
  - Ergonomic
- Biological Hazards
- Chemical Hazards
  - Air sampling
  - Bulk sampling
  - MSDS
  - Hazardous materials list
- Engineering Controls
  - Ventilation systems
- Administrative and work practice controls
  - JHAs
  - SOPs
  - Chemical hygiene plan
- PPE assessments
- Environmental Information
  - Waste streams
  - Waste sampling

SEG Based Data Benefits

- Description of process & task and identification of the P/B/C hazards
- Exposure assessment on each identified hazard:
  - Professional judgment (document reasoning)
  - Quantitative
    - Samples and statistics
    - Comparison to standards
    - Conclusion
- Assessment will specify
  - Required controls
  - Required medical surveillance
  - Required occupational health training
- Electronic data accessible by Occupational Medicine Physician during examination
- Will identify data gaps

Electronic Medical Records (EMR)

- While all the HERS ... HIS being developed
- Also developing the EMR
  - Flight Medicine Clinic & Occupational Medicine Clinic
  - Hear Track
- Was “Logician” now “GE Centricity”
  - Keep adding medical records
  - Keep adding medical process modules

Unsatisfied Requirements and Unfinished Tasks

- Task Tracker - recurring tasks
  - Go to project management software
- Refine sample collection process
  - Chain of Custody for Environmental Surveillance
- Calculate IH exposures from raw data
- Collect additional information on SEGs
- Establish standardized queries/reports
  - Recurring quarterly and annual reports
  - Survey and inspection reports
  - Exposure data by person or location

Unsatisfied Requirements and Unfinished Tasks (cont'd)

- Establish call log
  - Complaints
  - Survey requests
  - Training class sign-up
- Incorporate ergonomics survey database
- Validate retrospective data
- Incorporate TSI respirator and Metrosonics data
- Upgrade training database

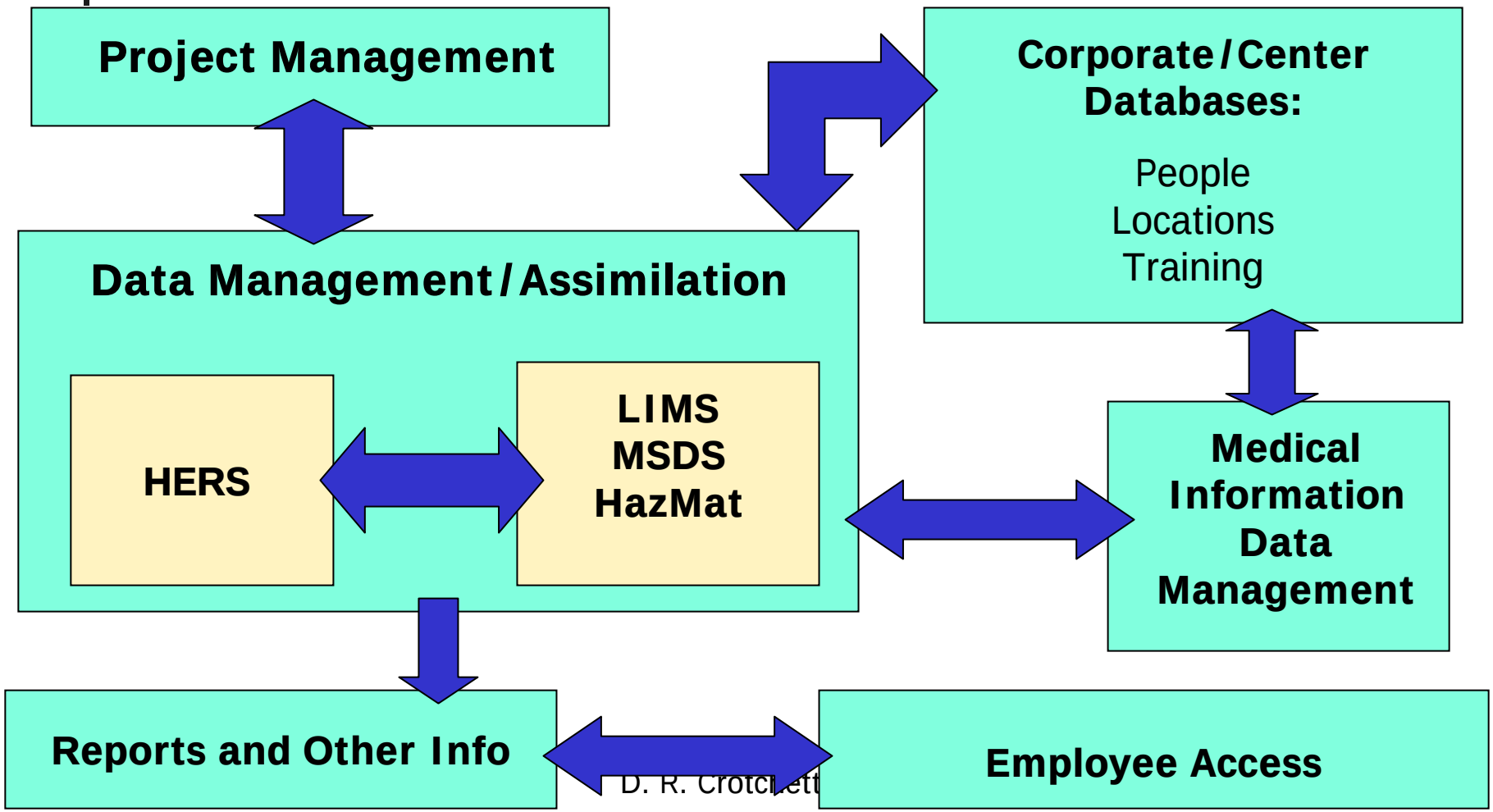
Foundation for the Future
Where We Stand Today

- Have an electronic Chain of Custody (eCOC)
- Have an exhaust ventilation database
- Have exposure data
  - Asbestos (air and bulk) to 1985
  - Other IH to ~1993
  - Radiation exposures to ~1966
- Have all information needed for the HBFC db
- Have collected some information on SEGs
  - Need more information

Foundation For The Future Where We Need to Grow

- Improvement of the IH to EHL interfaces
- Development of Future Interfaces
  - Facilities - link to Master tables, FM's able to view data and access reports online (
  - Human Resources / Contractors / Personnel
    - Improved communication of personnel changes
  - Use a JSC center-wide training record database
  - Development of Customer Center
    - Employees able to access records concerning their exposures
    - Access to reports on-line
- Integration with the EMR system

Vision For the Future

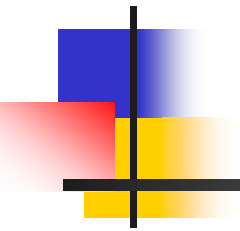


Lessons Learned

- Establishing information management systems take
  - More time than you thought
  - Take more resources than you thought
  - Require a structured process
    - Develop requirements
    - Get agreement
    - Develop a pilot
    - Test
    - Implement

Summary

- We have a foundation for the future
- We will eventually have fully integrated information management systems for occupational medicine and occupational health
- We will be positioned to link to center-wide databases when they are established



Questions ????